MAN -143-003-B
GPRS 4-20mA Transient logger
Part number RDL976/x/x Series

Version 1.1

Warning: This manual contains important safety and operating information. Please read, understand and follow the instructions in the manual.

Contents

Introduction

Thank you for choosing an HWM data logger(s), we trust it will provide you with many years of service.
The individual configuration of your logger(s) may differ slightly from the detailed descriptions that follow, but any additional setup information that you need, can easily be obtained from our customer support team.

Unpacking

As you unpack your new logger, please confirm that you have the following parts required to install the equipment. If there are any omissions, please contact our sales team to rectify or supply the missing parts.

- Pressure Transient logger
- Communications cable
- HWM IDTV Software (also available at www.hwm-water.com)

Please dispose of your waste packaging responsibly.

Before proceeding to site for physical installation, please take the time to configure your logger in an office environment. Most settings can be configured before visiting site and this will save time at the point of install, especially if the weather is bad.

You will need to have:-
A PC with Windows 7/8 installed (IDT also supports Windows XP & Vista)
A description and reference number for the installation site:

The reference number is split into a Zone and Location format to allow for grouping of individual “Locations” into larger regions or “Zones”.
The format of the number is configured during the initial installation of the software but essentially is a 7 character code, e.g. AB123CD

Installing the software

1. Insert the CD-ROM supplied into your CD drive.
   (If your PC does not have a CD drive, then either copy the files from the CD-ROM onto a memory stick, or download and run the installation file from the HWM website at www.hwm-water.com)

NOTE: If you use proprietary archiving software, such as WinZip or 7zip, please ensure that you extract the files to a temporary folder using the automatic extraction buttons that maintain the original folder structure.

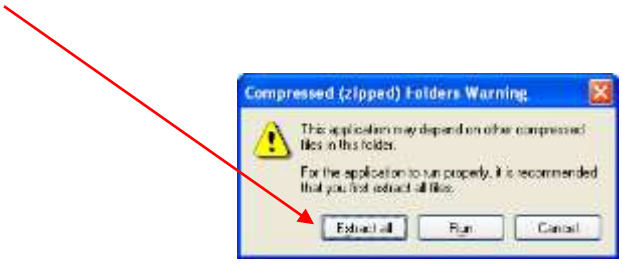
2. Ensure you have system administration rights for your computer, ask your IT department if you are unsure.

3. Locate the two files “setup IDT.msi” (in the IDT folder), which installs the program and “setup driver.bat” (in the Driver folder) which installs the necessary USB drivers for the logger.

4. Double click the “setup IDT.msi” file and click <<Next>> when you see the screen below

5. Follow the on screen installation instructions to complete the install of the IDT.

6. To install the USB drivers double click the “setup driver.bat” file identified in step 3. If you see the unzipping message below, click “Extract all” to extract the files to a folder first, then try again.

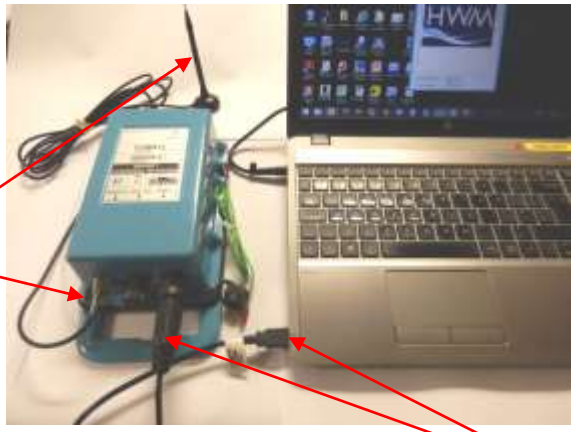


7. Follow the on screen instructions and the drivers will install automatically. Should the automatic installation fail, please check with your system administrator that you have sufficient rights to install the driver or try installing the drivers manually.
   You may be required to update Microsoft .Net; the install file is included with the IDT setup files for your convenience.

Installation and site hardware Diagnostics Tool (IDT)

Once you have installed the IDT, connect the USB cable first to the logger and then to your PC – Note there will be a short delay before the PC recognises the connection of the logger. This is normal, if your PC has sound enabled you will hear the “ping pong” sound as the logger connects.

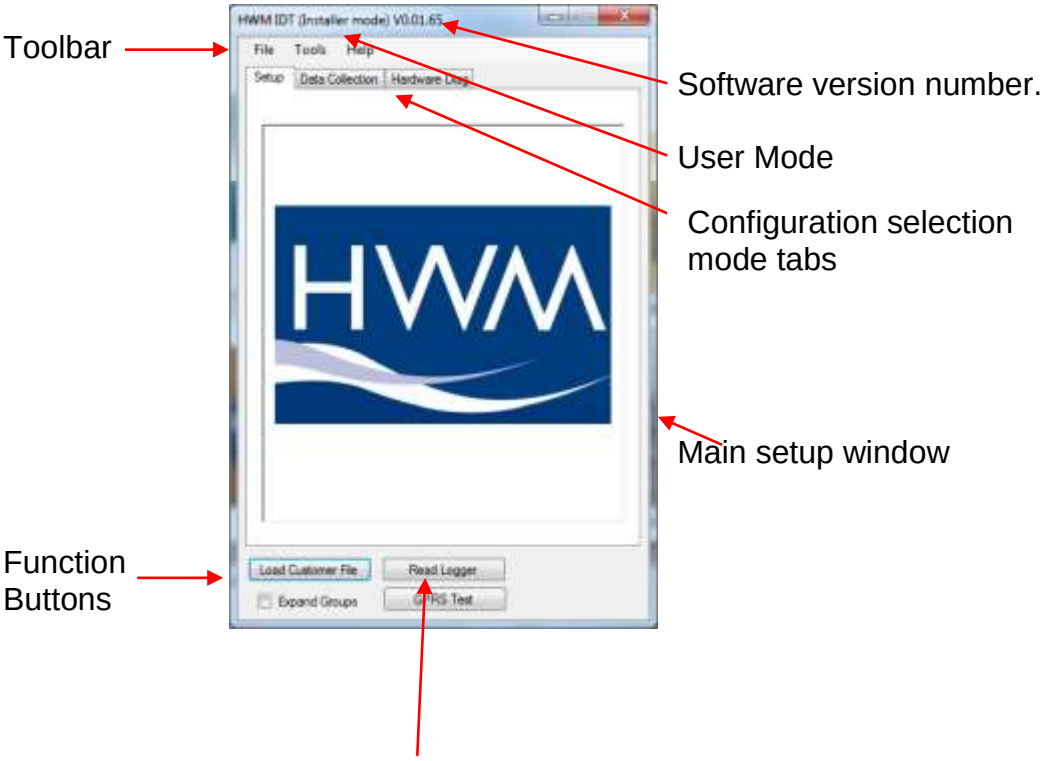
The first time you connect your Logger to a new USB port, Windows will configure the driver, wait until this process is completed before proceeding



Reading the logger

1. Run the “IDT” program.

2. The main window will appear of which the main items are:-



3. Now click the <<Read Logger>> button to load the current logger settings into the setup window.

Important: As the logger is not powered from the PC directly, to preserve battery, the logger will automatically disconnect from the PC and shutdown if there has been no activity for **10mins**. If you try to communicate with the logger after this time, a message “Connect/Re-connect logger!” will appear. Simply unplug the USB plug from your computer, wait for 2 seconds and then reconnect. This will wake up the logger again.

4. The IDT will now download the current settings from the logger.

At this point the IDT will check to see if there is a more up-to-date version of the logger firmware available on your PC, if so, you will see the message “Update Available”. Click <<Yes>> to update the logger, the process will take approximately 2 minutes, however the logger will be restarted so you may wish to transfer any logged data first, in which case click <<No>>.

The IDT checks the firmware version each time you read it.

5. Once all the settings have been loaded you will see this message, Click <<OK>> to start configuring your logger.

Configuring the logger

1. You will now see the main setup menu (expanded for illustration purposes). The menu is structured in sections for easy setup (a detailed explanation follows in 2.):-

i) Logger Details including logger ID; SIM card phone number current logger time and current logger status (Recording or Waiting to Record or Stopped)
Note – 'Waiting to record' means the recording will not start until the next sample period boundary.

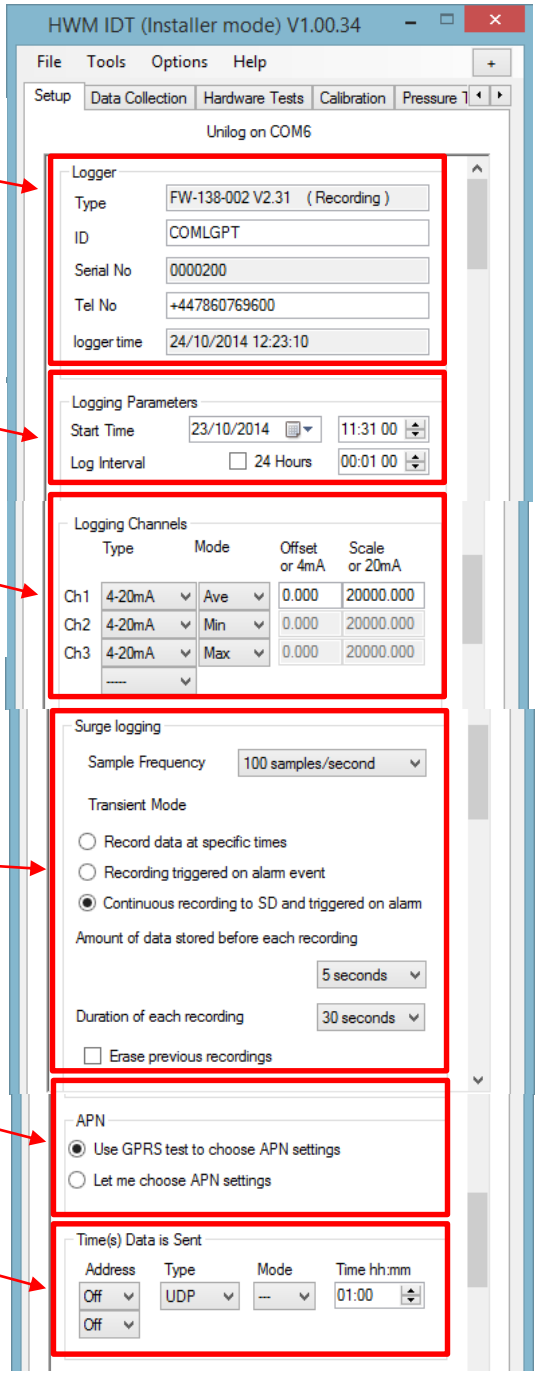
ii) Logger start time, data capture interval and sample interval

iii) Logger channel configuration including 4mA and 20mA configuration settings

iv) Transient capture settings

v) Service provider settings for SIM Card

vi) Call settings for sending data to the host



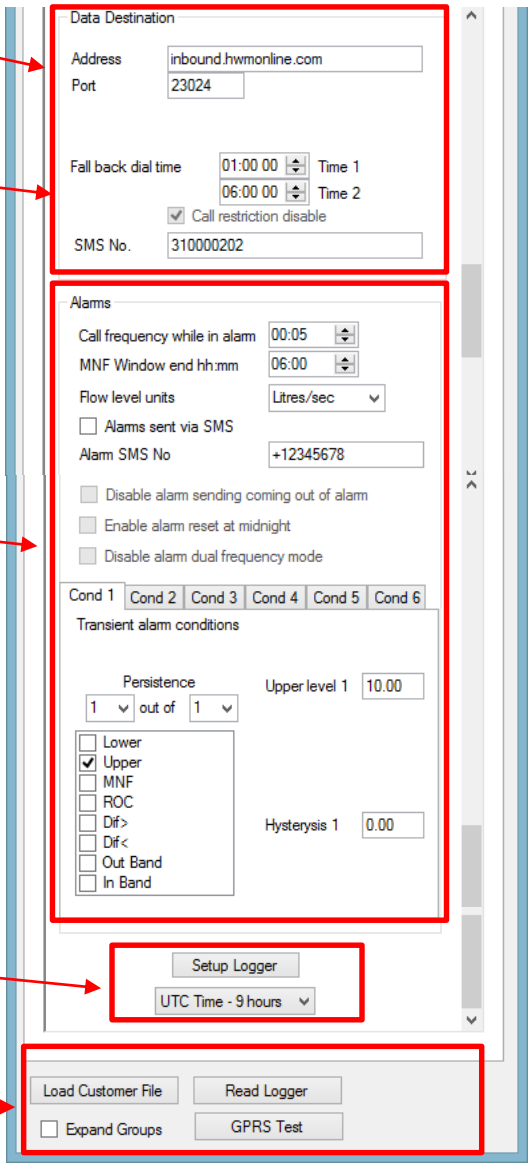
vii) Data Destination details, the server address for the UDP data

viii) Backup call in timing details in case of main call failure or external battery exhaustion and SMS message destination number

ix) Alarm configuration

ix) Final Setup Upload button and logger time zone selection

x) Main function buttons



2. Now you can enter the configuration you require for each section :

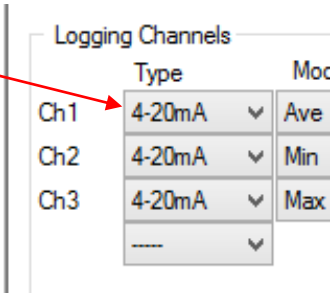
   i. **Logger** – enter the site ID that you wish for the logger, e.g. Postal/ZIP code of up to 7 alpha-numeric characters and the telephone number associated with the SIM card.
   If you ordered a SIM with the logger, this will have been programmed already for you, otherwise enter the number from your service provider in international format (e.g. +44…)

   ii. **Logging Parameters** – Accept the default start time or enter your own. Default start time is in the past so the logger will begin recording immediately. You can delay this start time by selecting one from the calendar or enter the time directly from your number keypad. Set your log interval if required – 15 mins is default. Sample interval for pressure channels is 30 secs by default – you cannot set a pressure channel below this but it can be greater than this if required.

iii. **Logging Channels** – Here you can configure your connections and the data you wish to see.

From the dropdown box select the Type of data to appear on Channel 1.

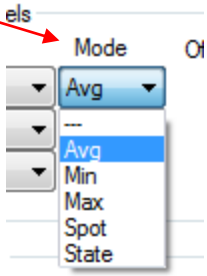
You can alter the channel allocations if you wish and click "-----" if you do not wish to use that channel.



Next choose what mode of collation you wish

Avg = Average reading over the log interval (use this for Pressure transient logging)

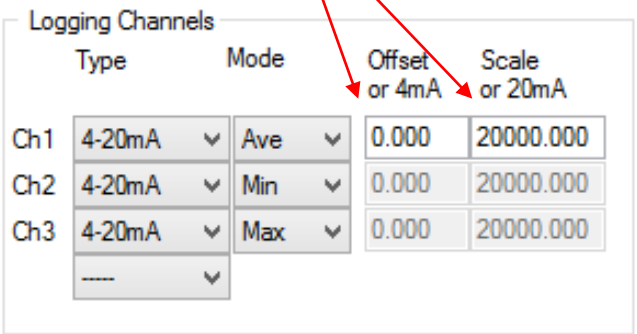
Min/Max = Min/Max values measured over the log interval. Use Min or Max or both to identify Transient periods for Pressure Transient logging



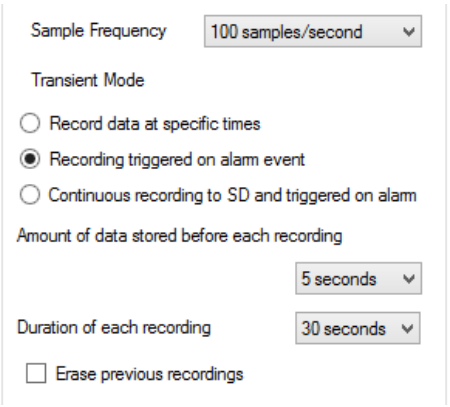
Spot / State = not required for Pressure Transient logging

Example - for a pressure transient analysis you may want to set the primary channel to 'Avg' so that the channel 1 graph will show average pressure readings over the sample period; but you might then set Channel 2 to Max so that the graph for Channel 2 will show the maximum readings during the sample period. This will narrow down the data that needs to be examined for the transient situations. Other channels can be set to record other phenomenen

Enter the 4mA and 20mA values in the boxes provided for Channel 1 – the other other channels will



iv. Transient settings -



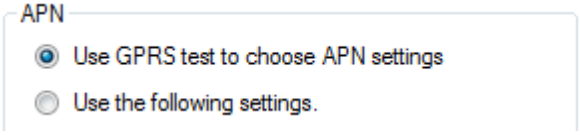
Select the transient sample setting you require from the drop down

Select the Transient mode option You require –

- Record data at specific times allows the transient event to be recorded for a selectable duration
- Recording triggered on alarm event allows the transient to be recorded for selectable durations before and after the event **(you will need to set the alarm conditions- see section viii)**
- Continuous recording to SD and triggered on alarm – used if the logger is expected to be in use for a considerable time - average recordings will be made to the SD card and transient data triggered by the alarm will also be stored

Select the amount of data stored before each Transient and the duration of the transient recording as required.

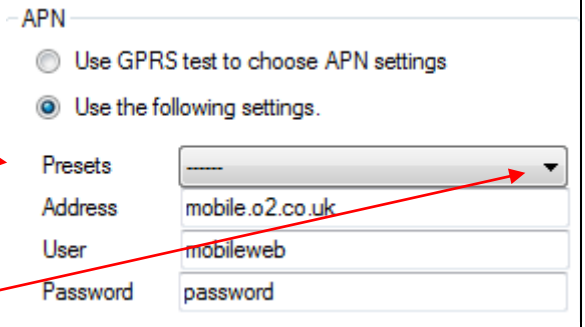
v. **APN** – If you have ordered a data pack from HWM you can leave this setting alone (as below) as your logger will have been preconfigured by HWM.



If you have ordered your data service & SIM card, then you will need to separately configure your service. HWM recommends that you allow the GPRS test utility to search for these settings automatically, however if you wish to enter them manually, click the button beside "Use the following settings"

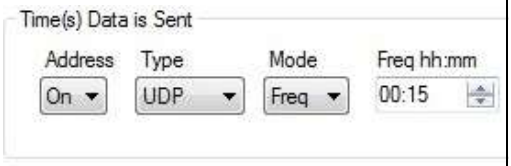
You can now enter your data service provider's details into the appropriate boxes.

Alternatively select your network from the drop down list of presets

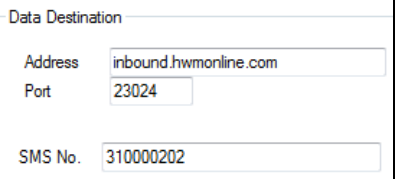


vi. **Time(s) Data sent** – Here you specify the Call Out requirement for the logger. There are 2 modes available, SMS and UDP. SMS is a one way unacknowledged data transfer service using the common text messaging service. UDP is a true 2 way confirmed data transfer process via the internet over a GPRS connection. Both have advantages, however HWM recommends UDP wherever possible as this offers the most secure method of data transfer.

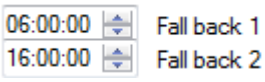
Switch on the Call out by selecting "On" in the Address selector, then choose 'UDP' or 'SMS' from the Type selector. See below for Mode settings



vii. **Call Addresses** – These will usually have been entered at the factory and should not be adjusted, however if you have your own data server, then you can enter either the telephone number for your receiving modem, or the UDP address & port no for where the logger is to send its data.

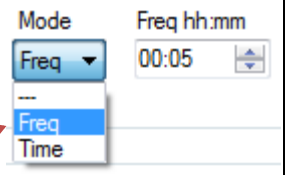


The fall back times specified here instruct the logger what to do in the event of the primary Call Out requirement not being met. This can be for 2 reasons:-



a. If a connected external battery goes flat, the logger will default from the normal call out requirement to a 2 times per day routine. The times of these calls are specified by both Fall back 1 & 2.
b. If a GPRS data call cannot be completed due to non-availability of a GPRS service, then the logger will try to send an SMS message at the Fall back 1 time.

Now choose your Call out mode, this can be either "Freq" for a call made at a regular frequency throughout the day or "Time" to specify up to 8 individual times during the day. Enter either the frequency (e.g.06:00 = every 6 hours) or the time for the call in the box.



viii. **Alarms** – The Logger has a comprehensive alarm system that you can configure to send out Alarm messages when certain defined conditions are breached and for the Transient logger you will need to use Alarms to define the transient levels from which you want the data to be recorded.

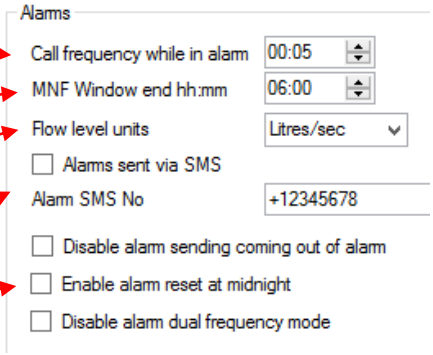
When an alarm condition is triggered, a new call in frequency (i.e.faster) can be specified to allow the observer to gain more up-to-date data during an event.

Minimum Night Flow – not applicable for Transient logger

Choose your flow units – not applicable for Transient logger

If you want SMS alarm messages to be sent, tick this box and enter an Alarm SMS phone number

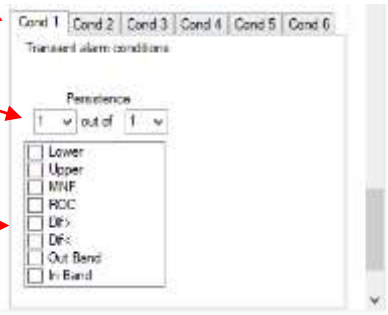
Select these alarm conditions if required by ticking the boxes



There are 8 possible different alarm conditions that can be configured, select each one from the tabs – **Note TAB 1 is for Transient alarms**

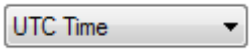
Set your persistence or trigger point, e.g. for transients you will want 1 out of 1 in order to pick up every transient – see note below on persistence

Choose your type of alarm from the list:-
Lower or **Upper** Limit breach - Enter the alarm threshold – Recommended to use Upper for Transients
Minimum Night Flow (**MNF**) - not applicable for Transients
Rate Of Change (**ROC**) not applicable for Transients
Difference (**Dif**) between channels - not applicable for Transients
Either **In** or **Out** of **Band** set by Upper & Lower levels



Note on Persistence: When an alarm is triggered, if the value is set to zero then immediately the threshold is re-crossed then a clear message will be sent. If there is a period when the alarm threshold is borderline, this can result in numerous messages for the same event. By specifying a value in the Hysteresis box, you can provide a window that allows the threshold to be repeatedly crossed without sending repeated messages. e.g. with an Upper limit of 5 and a hysteresis of 1, the alarm will trigger at 5, but the clear message will not be sent until the value drops to below 4.

3. Final steps – By default the logger is set to UTC (Coordinated Universal Time, equivalent to GMT), however you can choose either an offset from this time, or for the logger to use your PC time.

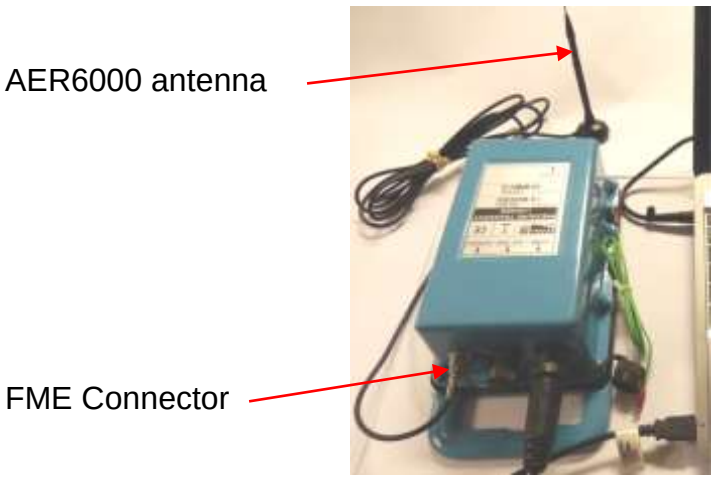


4. When you are happy with all the settings click the <<Setup Logger>> button to program the logger.

Data Communications Confirmation – GPRS Test

It is important to confirm that your logger is communicating with the data server before you leave site (or to be confident, your office), so you should undertake a GPRS test before you leave the logger in the field.

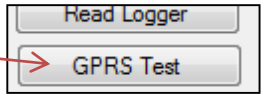
1. Connect an appropriate GPRS antenna to the FME socket on the logger. The location on the logger can vary depending on the configuration of logger ordered, but the picture below illustrates a typical connection.
2.



Note: If this is the final aerial connection, ensure that the connector is tightened with spanner or pliers to prevent water ingress to the antenna plug as this will reduce performance. Do not over tighten.

3. Run the IDT and 'Read your logger' (as in section 'Reading the logger' steps 1 to 5).

4. Now click the <<GPRS Test>> function button.



5. The GPRS Test program will now automatically execute a communications check with the data server, DataGate™ and deposit a test message that can be checked later on.

The test will take a few minutes and will confirm that the communication is successful.

Troubleshooting a GPRS test failure.

There are a number of reasons why a GPRS test may fail,

the following points should be checked before calling HWM support for assistance:-

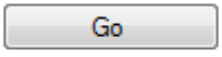
Possible Problem	Solution
Network Busy due to excessive traffic. Commonly occurs around schools.	Retry the test after a few minutes.
GPRS signal not available at your location. Not all Cell masts carry GPRS traffic	The logger will call into the data warehouse once per day using an SMS message; relocate the logger if more frequent communications is required.
Network signal not strong enough. You need a CSQ (reported by the GPRS test) of at least 8 for reliable communications.	Relocate the antenna if possible or try alternative antenna configurations. Ensure antennas are vertically orientated where possible. See aerial placement notes section.
APN settings incorrect.	The GPRS tester knows about a large number of cellular networks and will try as many settings as possible and correct any error automatically. If there is still a failure, then you need to check with your network operator that you have the correct settings for your SIM.

If you continue to experience problems with communication, you may need to check the network coverage in your location.

Taking a reading from the logger and hardware tests

You are now ready to confirm that the logger is measuring real data from the sensors by taking an Instantaneous Value.

1. From the IDT menu bar, click the <<Hardware Test>> tab.
2. Click the <<Go>> button to start to check the operation of your installed system.



3. The IDT will now display its measurements for a period of 10 minutes to allow you to diagnose any issues with cabling

Ambient temperature
Battery voltage

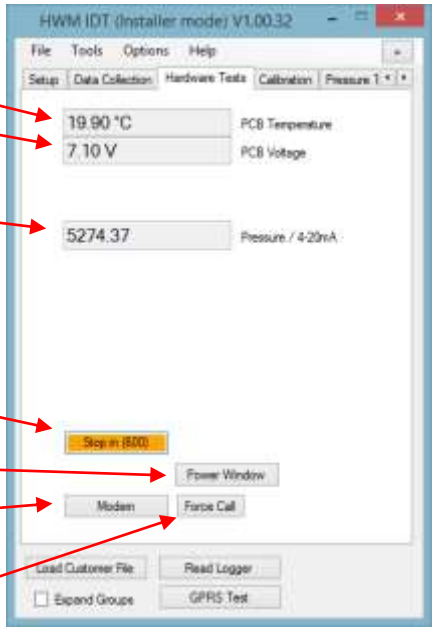
Instantaneous 4-20ma value

Time until test stops & Manual Stop button

Open 10m power window button

Modem Diagnostics

Force call now – will send in data if there is any available



When you are ready to stop the test just click the <<Stop>> button.

4. A “Power Window” allows you to keep the logger’s modem turned on for a period of 10 minutes. This allows you to close the chamber lid and send a text message to it to confirm that communications is still OK.

5. Pressing <<Force Call>> forces the logger to send its data in immediately. Useful for when you wish to shift a logger to a new site.

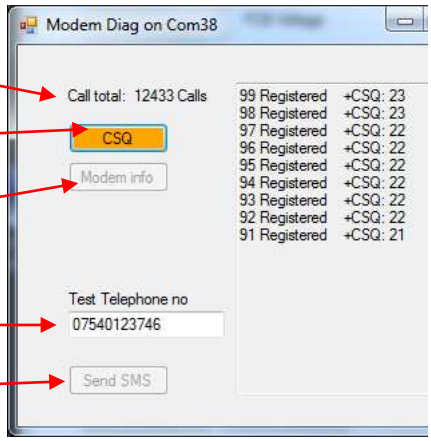
6. The <<Modem>> button allows some more advanced diagnostics to be performed on the modem.

Indicates total number of calls made

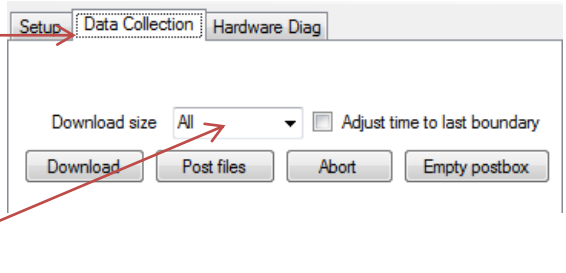
Provides the current signal strength

Provides the IMSI & IMEI numbers for the modem

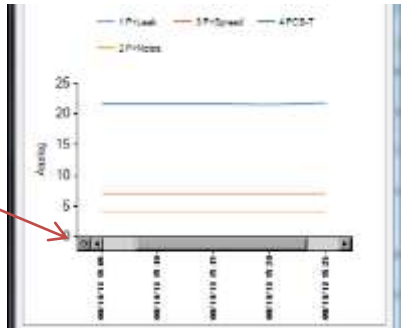
Enter a mobile phone number here & click <<Send SMS>> to instruct the logger to send you an SMS test message.



7. If you click the <<Data Collection>> tab you will now see a set of tools for downloading data from your logger for later uploading to the data server. It can also be of assistance for diagnosing problems.



   a. From the Download size selection, choose how much data you wish to retrieve, from everything the logger has stored to any un-sent data since the last time the logger called in.
   b. Click <<Download>> and choose “Archive” when prompted and the data will commence downloading. If you wish to stop the process, click <<Abort>> and the download will cease.
   c. A small chart will now be displayed showing the data downloaded. By using your mouse to draw boxes in the graph area you can zoom into areas of interest. Click the small circles at the end of the drag bars to zoom out. By hovering your mouse over the points on the graph, you will see the exact value recorded.

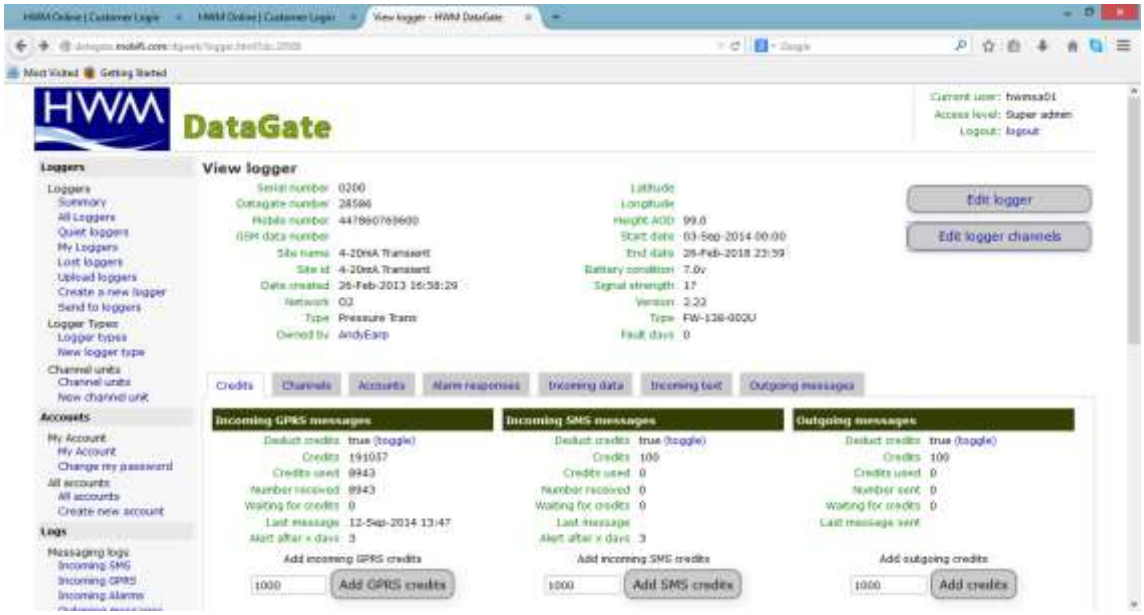


   d. If your logger is in a location where GPRS communication is not possible, you can now upload the data when you are next connected to the internet. Simply click <<Post files>> and all the data you have downloaded to your PC will be uploaded in one go. If you are downloading more than one logger in a route, all data is stored and transmitted together. If you decide that you do not wish to post the data you have downloaded, click the <<Empty postbox>> button to remove the downloaded data from your PC.

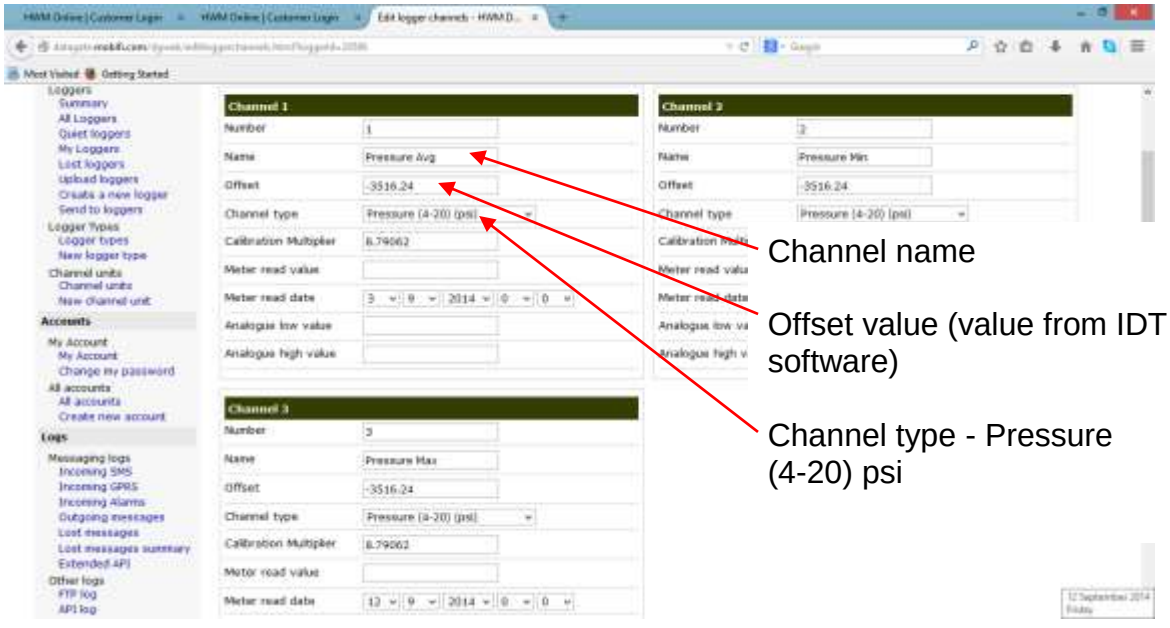
      Note: Choose the other data types depending on what recordings you wish to retrieve / view.
      Note: For Pressure transient logging you will only be able to view the summary graphs for the channels you have set configured. To view the pressure transient detail you would need to download the data into Radwin software

Setting up the Channels in Datagate for a Pressure Transient Logger

In your Datagate account identify the correct logger, double click on it and then select the 'edit channels' button –



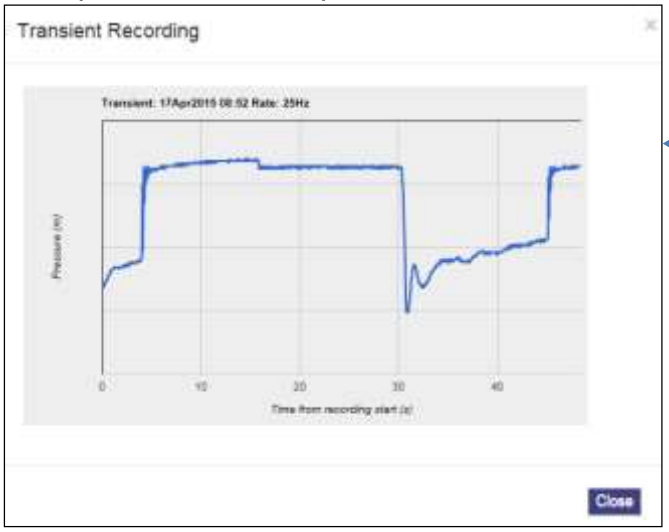
For each of the channels that you have configured in the logger enter the correct details for in the fields as follows –



Once the data is coming in you will be able to view the graph on HWMOnline.

The data will be displayed as additional traces on the graph for a Sample Frequency setting of Sample Interval. For higher Sample Frequency rates the primary trace on HWMOnline will display a diamond symbol to indicate the point where a transient occurred.

Click the diamond to provide a close up view of the transient



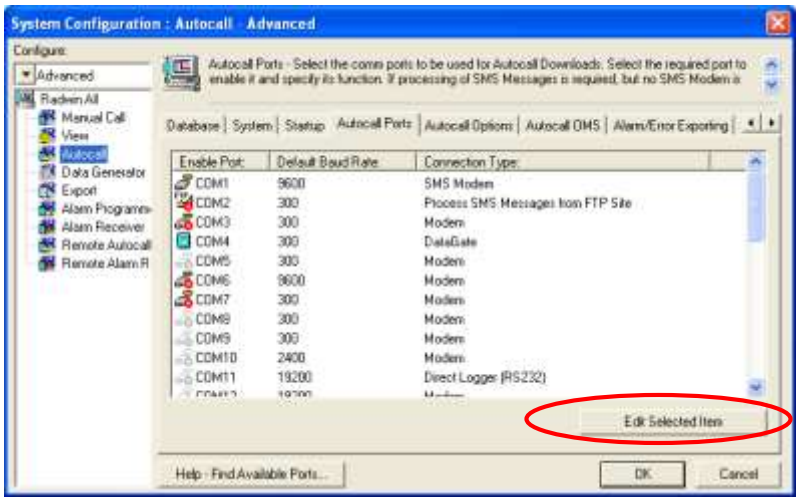
For more advanced manipulation and viewing of transient data you can download the data from Datagate into Radwin. See the following section on how to install and setup Radwin.

Setting up Radwin software

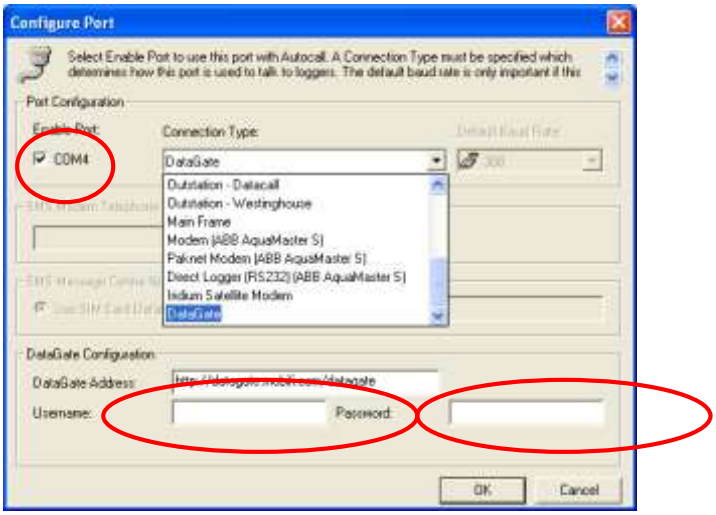
Two things must be done –

1. **Set up Radwin to receive data from Datagate**

First set up Autocall as follows -
In Setup > System configuration > Autocall ports
Select a free port (highlight it and then click Edit selected item)



In 'Edit Selected Item' Screen then select 'Datagate' from the connection Type drop down.



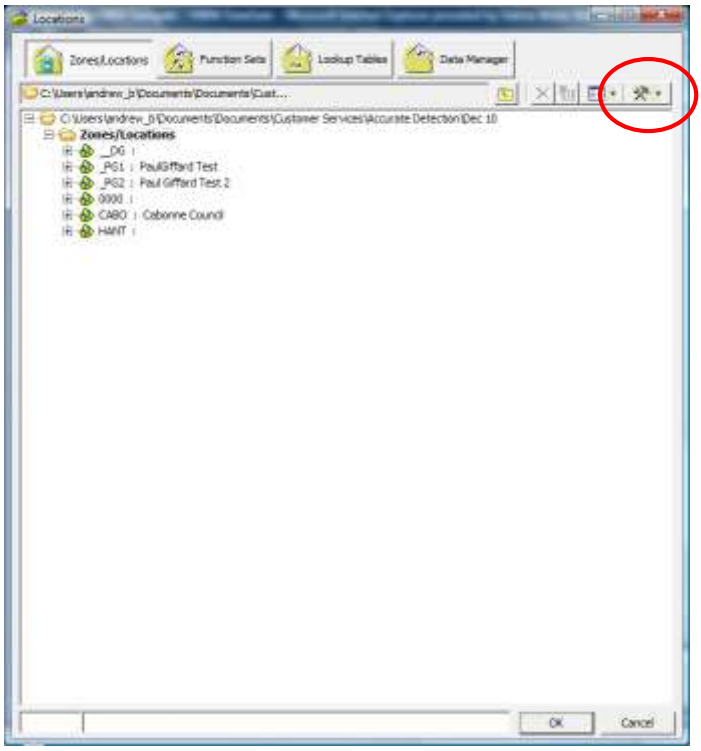
Click on Enable port (tick the box)
Enter your Datagate account details in Username and Password. (These should have been supplied to you)

Press 'OK'

You then should see :

2. **Set up the loggers in the Database (if they are not already there).**

In Set up > Options > Item configuration you should now see your logger database as below.



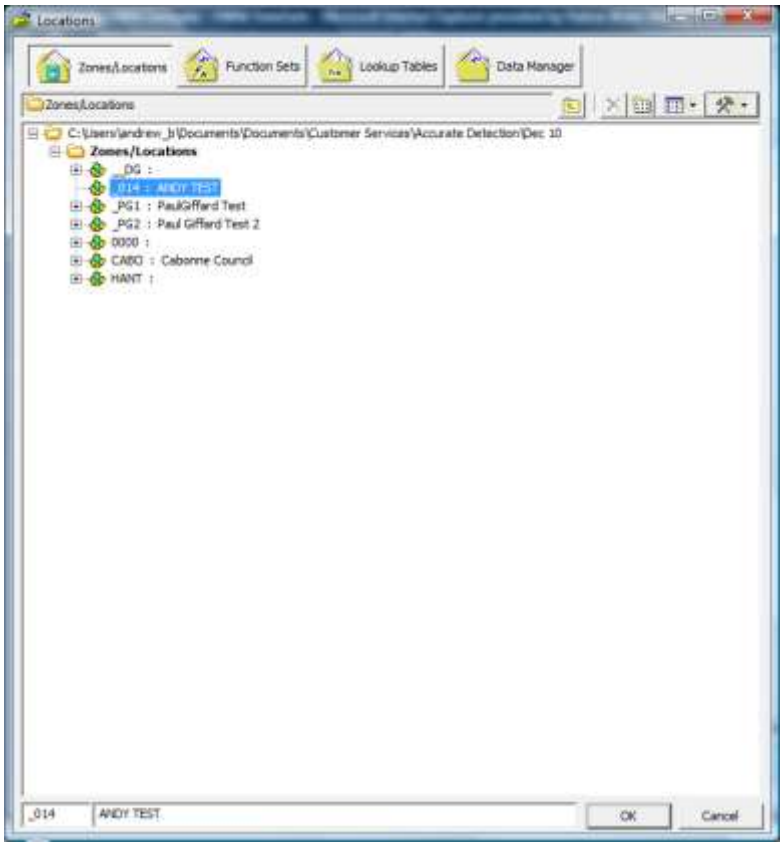
If your logger details are not here then you need to enter your logger details as follows.

You may need to add a new Zone (or you can add your logger to an existing Zone.)
To enter a new zone –

Click on the ‘Hammer & Sickle’ icon (see screen shot above)
Then select ‘Create New Zone’ to reveal this screen shot

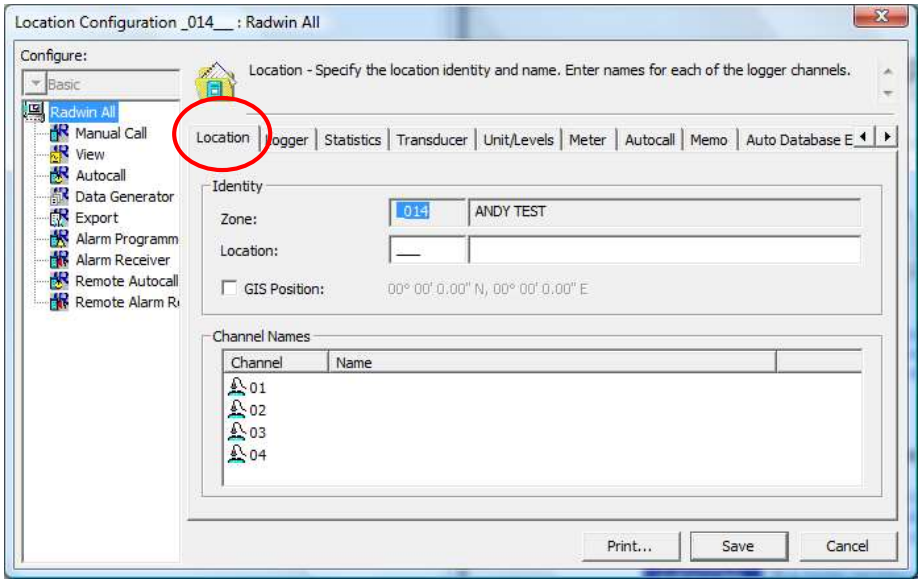
Enter your Zone I/D and Name and then ‘Save’.

You should now see the new Zone in the list as below.



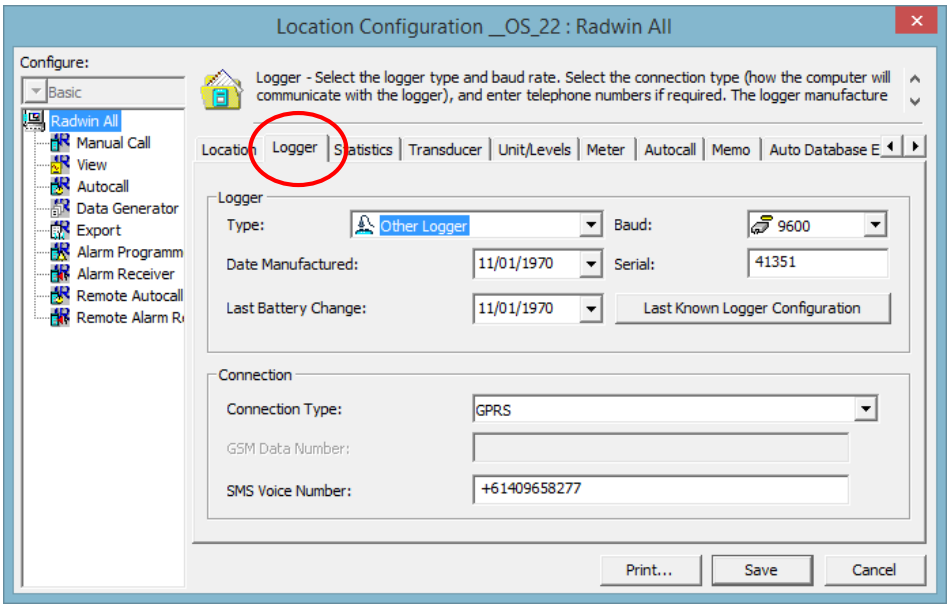
Highlight the new Zone and select the ‘Hammer and Sickle’ Icon again
This time select ‘Create New Location’

You should now see this screen (below)



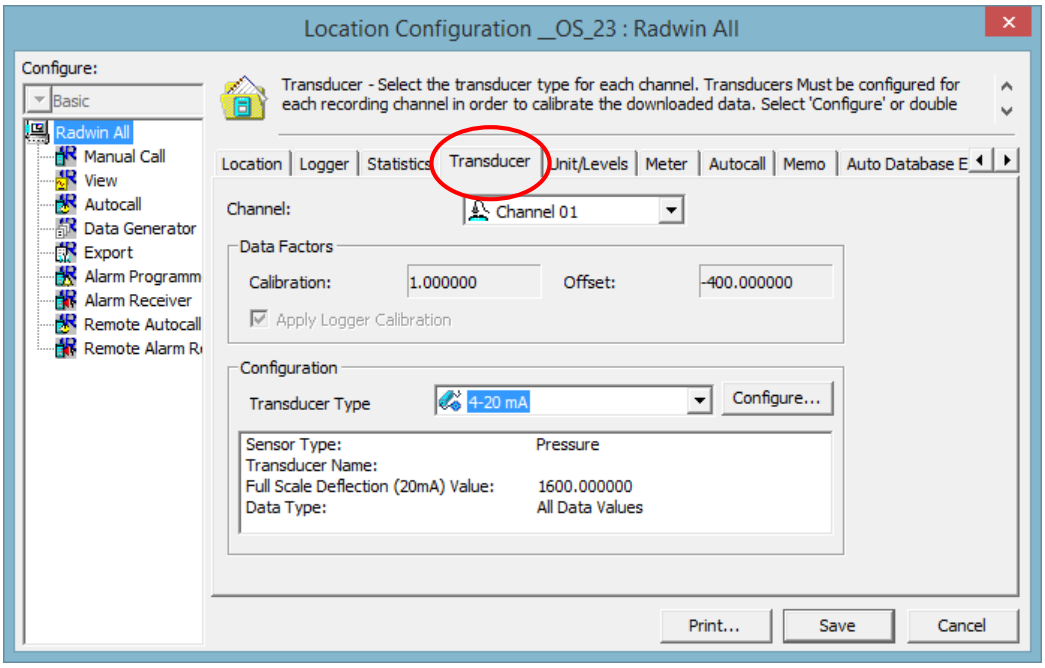
First select the Location Tab - enter your location description (numerical and alphanumeric descriptions)

Then select the 'Logger' tab –

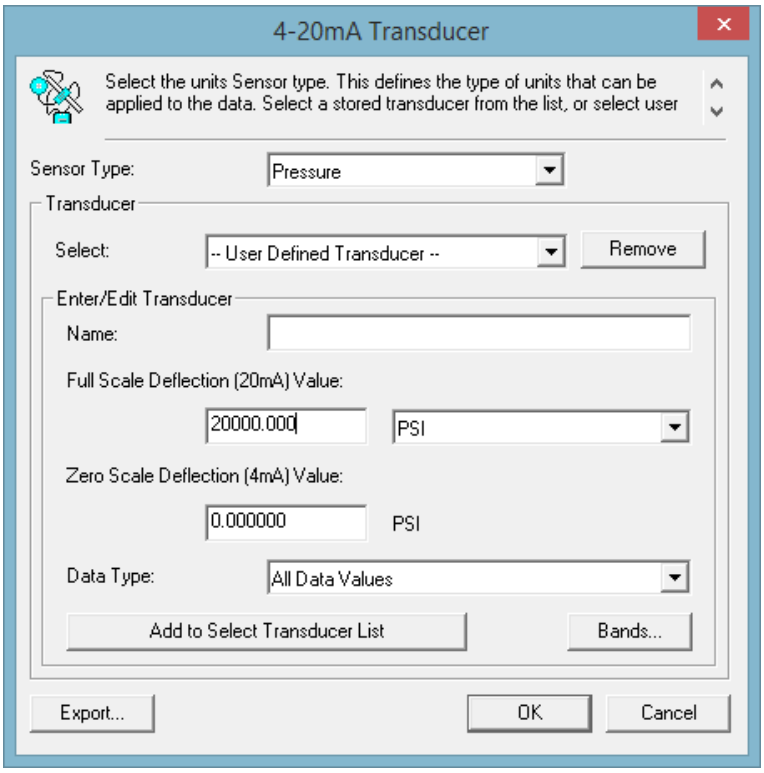


Fill in the logger details as accurately as possible.
Logger type from the drop down – **Note : For Pressure Transient Logger the type is 'Other Logger'**
Baud rate is automatically set
Serial number can be entered – it is found on the logger label
Connection type – select GPRS from the drop down
SMS Voice number – be sure to enter the correct logger phone number in international format **(+44 drop the zero- OR for international numbers ensure it is exactly the same as the number in Datagate) DOUBLE CHECK THIS NUMBER IS CORRECT**

Then select the ‘transducer’ tab -



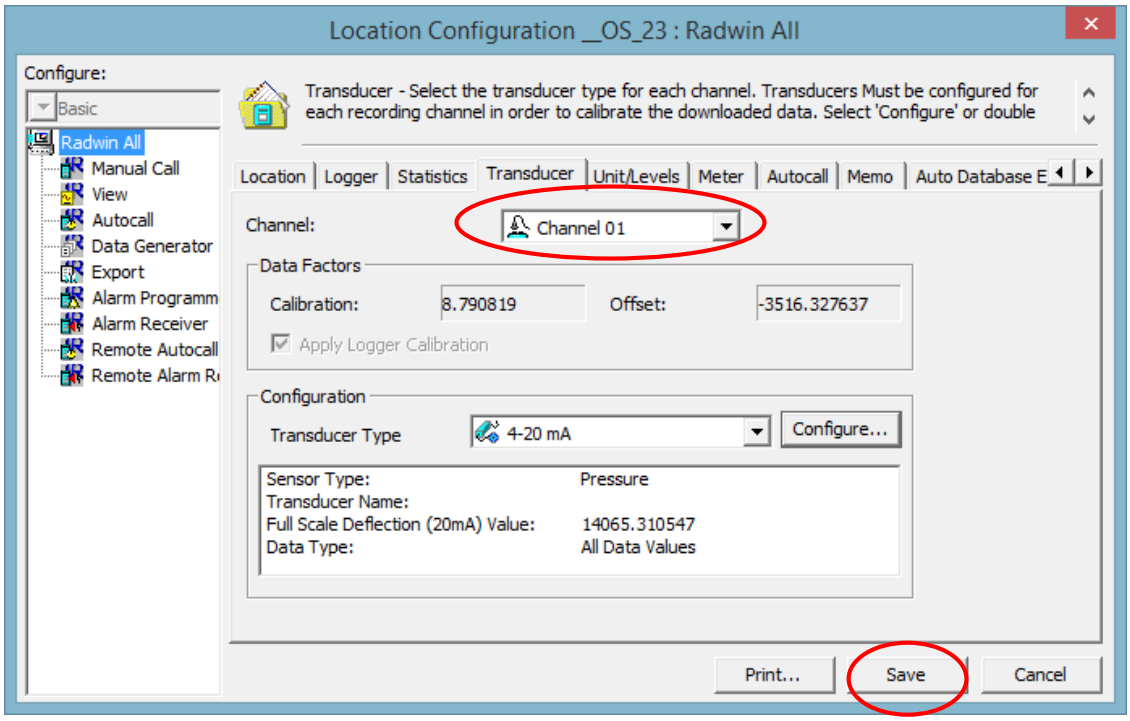
Select 4-20mA for the transducer type then select Configure –



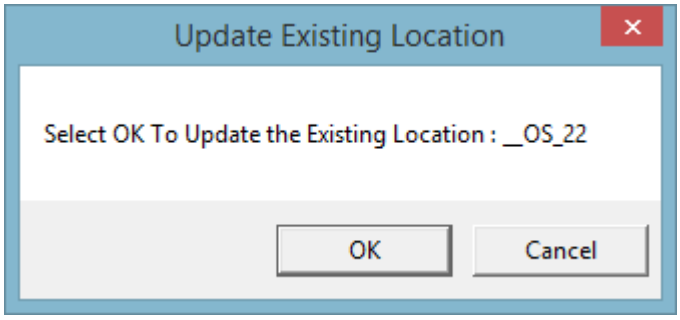
Select PSI and enter the 4mA and 20mA values (as above)

Note when you select ‘OK’ to accept this the FSD 20mA value appears different in the below screen –it is OK – note the Cal and offset values are correct.

Remember now to repeat this process for the other channels you have set up by selecting each channel from the drop down.



Once the channel configuration is completed select ‘Save’



Select ‘OK’ to complete the logger configuration in Radwin software

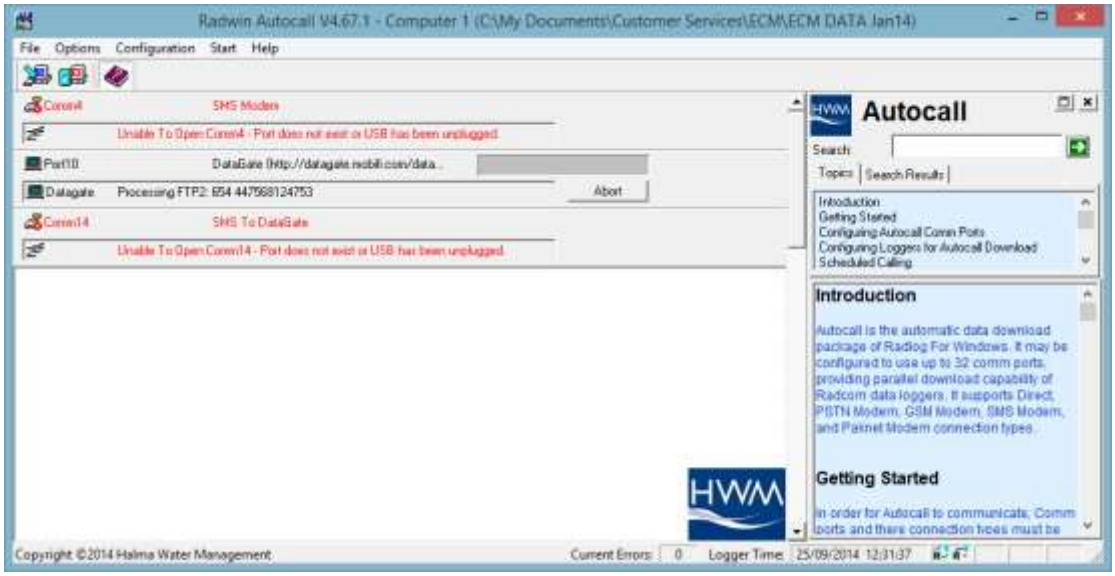
Repeat this process for each of your loggers.

Downloading data from Datagate to Radwin

Because of the size of the data to be downloaded from Datagate we would advise you to run Autocall all the time on your PC so that Radwin is constantly downloading and updating the data in its database

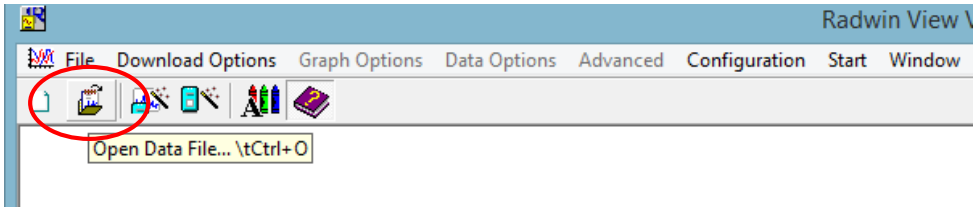
Start Autocall

This will process all the available data messages from Datagate relating to your loggers.

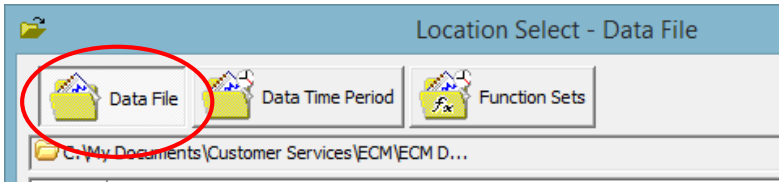


Once the data is constantly downloading and updating the Radwin database you can view it as follows –

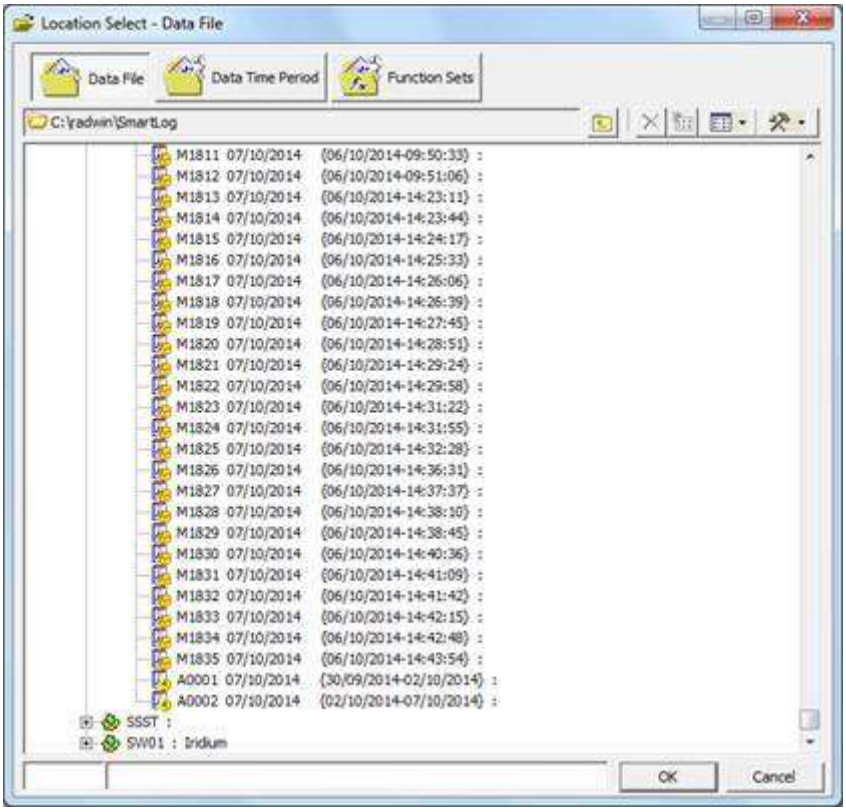
From the View screen select the ‘Open Data file’ icon –



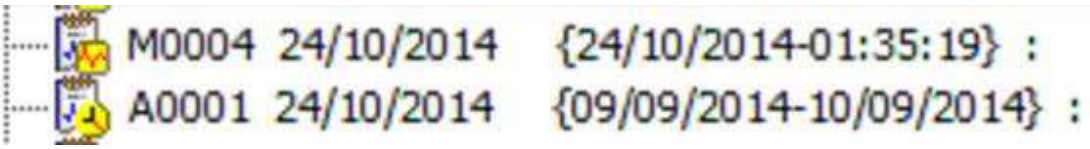
Then select the ‘Data File’ option -



Find the correct logger in the data base and click on the '+' sign to reveal the data files –



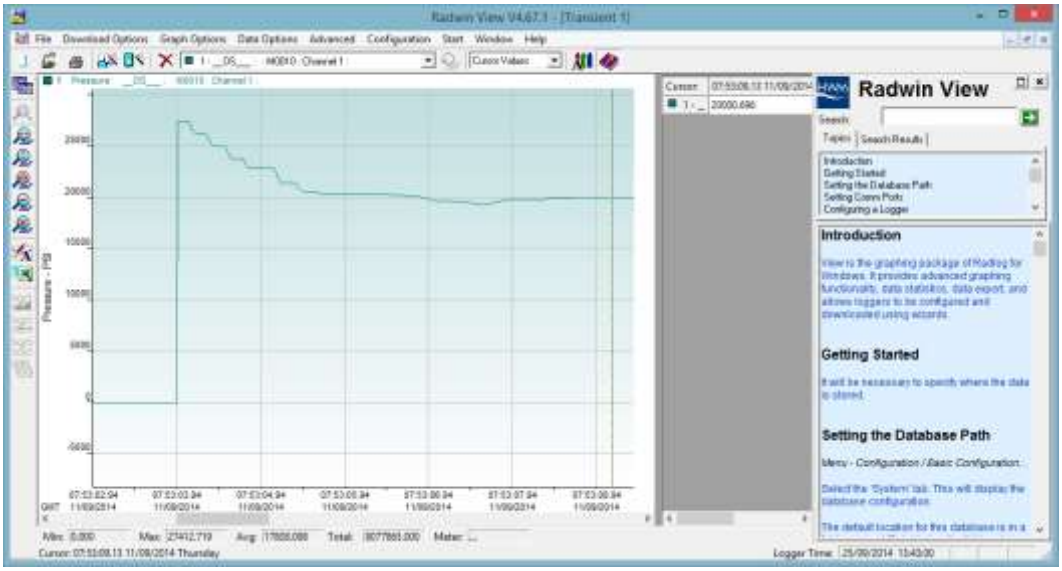
'A' Files are normal logging (non transient) archive files which are appended at every Autocall download; whereas 'M' Files are the transient files, as they are separate events that do not get appended to.



Note - 'A' Files cover a period between two dates, whereas Transient 'M' files are denoted by the date and time allowing easy access to the main transient events that you might want to investigate in detail.

Double click on the data file with the time and date of the transient you want to look at and select 'OK' at the following screen –

This will launch the Radwin View Graph which can be manipulated to view the pressure transients in detail using the normal View features and controls -



Note- If you configured your logger as per the suggestions in this guide you will have three graph lines – Average, Max and Min values. The Max and Min graphs can be expanded to allow detailed investigation of the poasitve and negative transients.

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